Small Business Innovation Research/Small Business Tech Transfer

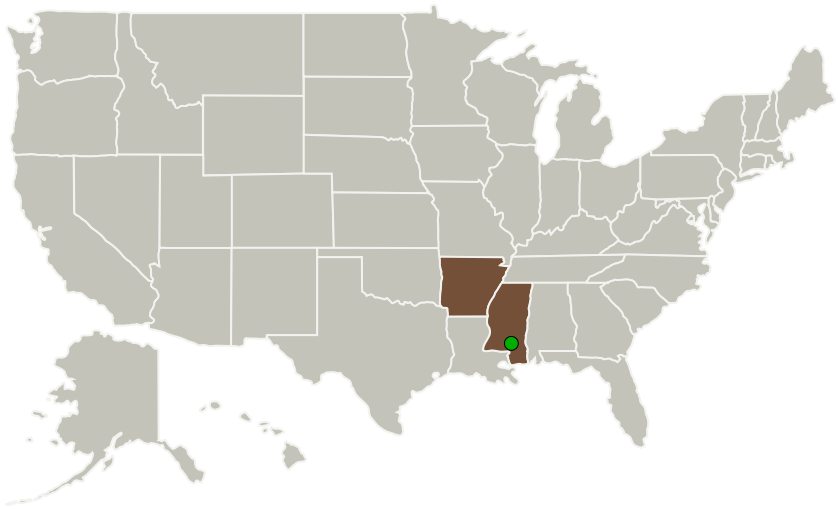
Extreme Temperature Radiation Tolerant Instrumentation for Nuclear Thermal Propulsion Engines, Phase I

Completed Technology Project (2015 - 2015)

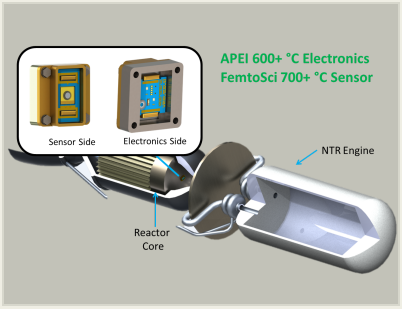
Project Introduction

The objective of this proposal is to develop and commercialize a high reliability, high temperature smart neutron flux sensor for NASA Nuclear Thermal Propulsion (NTP) systems. Arkansas Power Electronics International (APEI) and International Femtoscience (FemtoSci) technology offers the following: (1) 600+ degC ambient operation of a full wireless smart sensor system (2) Extreme-environment electronics utilizing wide band gap integrated circuits and advanced magnetic components (3) CVD nano-diamond neutron flux sensor for near-core measurements, capable of operation to >700 degC (4) Harsh environment packaging technologies to ensure reliable operation at 700 degC (5) Radiation hard, high temperature electronics will offer high reliability nuclear propulsion instrumentation, as well as provide solutions for terrestrial nuclear power generation instrumentation.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Arkansas Power Electronics International, Inc.	Lead Organization	Industry	Fayetteville, Arkansas
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi



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Primary U.S. Work Locations	
Arkansas	Mississippi

Project Transitions

June 2015: Project Start

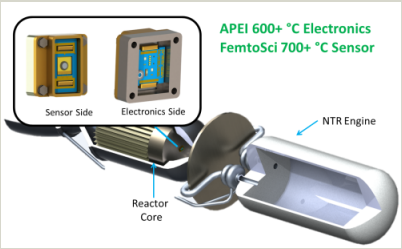
December 2015: Closed out

Closeout Summary: Extreme Temperature Radiation Tolerant Instrumentation for Nuclear Thermal Propulsion Engines, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138998)*

Images



Briefing Chart Image
Extreme Temperature Radiation Tolerant Instrumentation for Nuclear Thermal Propulsion Engines, Phase I
(https://techport.nasa.gov/image/136428)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Arkansas Power Electronics International, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

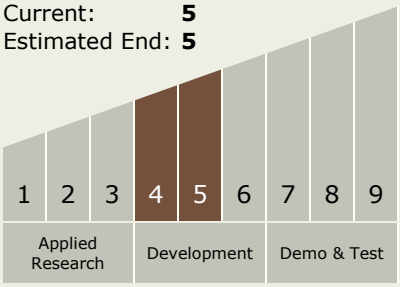
Carlos Torrez

Principal Investigator:

John Fraley

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.4 Advanced Propulsion
    - TX01.4.3 Nuclear Thermal Propulsion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System